

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
Digital Audio Broadcasting Systems	)	MM Docket No. 99-325
And Their Impact On The Terrestrial	)	
Radio Broadcast Service	)	
To: The Commission		

**COMMENTS**

**Backyard Broadcasting, LLC  
Beasley Broadcast Group, Inc.  
Black Crow Media Group, L.L.C.  
Bonneville International Corp.  
Broadcast Electronics, Inc.  
Broadcaster Traffic Consortium LLC  
CBS Radio Inc.  
Clear Channel Communications, Inc.  
Commonwealth Broadcasting  
Corporation  
Continental Electronics Corp.**

**Cox Radio, Inc.  
Emmis Communications Corporation  
Entercom Communications Corp.  
Greater Media, Inc.  
Harris Corporation  
Journal Broadcast Corporation  
Lincoln Financial Media Company  
Nassau Broadcasting Partners, L.P.  
Nautel Maine Inc.  
NRG Media, LLC  
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July 6, 2009

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## TABLE OF COMMENTS

I.	The Commission Should Grant the Digital Power Increase Request Now .....	2
A.	Significant Investment in HD Radio Technology Is At Risk Due To Extremely Conservative and Inadequate FM Digital Power Limits.....	2
B.	Grant of the Digital Power Increase Request Will Facilitate HD Radio Replication of Analog Coverage.....	4
C.	Extensive Real-World Tests Demonstrate the Requested Digital Power Increase Would Not Create Significant Harmful Interference to Analog Stations.....	8
D.	Grant of the Digital Power Increase Request Should Not Be Delayed.....	10
II.	The Commission Should Permit Stations to Increase Digital Power Up To -10 dBc.....	10
A.	Grant of the Full Power Request is Warranted .....	10
B.	An Increase Up To -14 dBc is Acceptable Only As An Interim Measure Prior to a Full Increase to -10 dBc .....	12
III.	The FCC's Current HD Radio Standards Are Adequate .....	14
IV.	The Commission Should Expeditiously Grant the Power Increase .....	15
V.	Conclusion .....	16

## **SUMMARY**

A diverse group of large and small broadcasters that operate commercial and noncommercial FM radio stations nationwide, the Broadcaster Traffic Consortium, and the four largest broadcast equipment manufacturers submit these Joint Comments and urge the Commission to expeditiously grant the long-pending request to allow an increase in FM HD Radio digital power from the current level of -20 dBc up to -10 dBc.

The significant investments in HD Radio technology by broadcasters, consumers, and equipment manufacturers are at risk, and the conversion to digital-only radio may be stalled, as a result of the limited digital power level at which FM HD Radio stations have been constrained to operate since hybrid broadcasts were first permitted in October 2002, nearly seven years ago. It is widely recognized that current limits on FM HD Radio power results in FM digital service that does not replicate a station's analog protected contour, with frequent signal drops even within the reduced digital service area. The restricted FM digital power levels also result in poor digital building penetration. These service challenges are particularly problematic for the more than 1,000 digital multicast channels that do not have a backup analog signal for listeners to receive when the digital signal is unavailable.

The considerable record in this proceeding, including the results of long-term, real-world testing conclusively demonstrates that a 10 dB power increase is necessary for FM broadcast stations to be able to provide reliable HD Radio digital service that more closely replicates their analog contours without signal drops, and also provides adequate indoor signal reception. As awareness and adoption of digital HD Radio services continue to grow, and portable HD Radio receiver devices – which face their own unique reception challenges – are introduced into the

marketplace, it is critical that listener experience with HD Radio service be reasonably comparable to current enjoyment of analog radio. That is not the case today.

Equally important, the comprehensive real-world tests that support the HD Radio power increase request have shown that the increased digital FM power will not create any material risk of harmful interference to existing first adjacent analog operations.

Joint Commenters respectfully submit that the Commission should not delay grant of the digital FM power increase request. Under the most optimistic of timelines, the study that NPR Labs recently commenced will not be available until September at the earliest. Withholding action until that study can be reviewed and commented upon would likely mean that any power increase would be delayed well into 2010. Given the current status of consumer roll-out of HD Radio receivers and the introduction of portable receivers such as the Zune HD, a further delay could significantly impede the successful transition to digital radio.

If the Commission does not permit HD Radio stations to increase their FM digital power up to -10 dBc, it must recognize that any increase to less than -14 dBc would not have utility, and that -14 dBc must be a stepping stone to a full increase to -10 dBc. Without a meaningful interim increase and a fully-effective ultimate digital power level, many broadcasters will be unable to determine the most effective and economical approach to their digital conversion, and instead will defer equipment purchases for any power increase.

Finally, the power increase request was deliberately structured so that it could be implemented within the FCC's current regulations without the need for new standards or rules.

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**COMMENTS**

The signatories hereto (“*Joint Commenters*”), by their attorneys, submit Comments in the above-captioned proceeding, in which the Commission has solicited industry input on issues related to a proposed increase in FM digital power filed in June 2008.<sup>1</sup> The Joint Commenters comprise a diverse group of large and small broadcasters that operate commercial and noncommercial FM radio stations throughout the country, the Broadcaster Traffic Consortium,<sup>2</sup> and the four largest broadcast equipment manufacturers. Joint Commenters hereby reiterate their request that the Commission grant an increase in permissible FM HD Radio digital power from the current level of 1 percent of a station’s authorized analog power (-20 dBc) up to a maximum

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<sup>1</sup> *Comment Sought on Specific Issues Regarding Joint Parties’ Request for FM Digital Power Increase and Associated Technical Studies*, MM Docket 99-325 (May 22, 2009) (“*Public Notice*”).

<sup>2</sup> The Broadcaster Traffic Consortium (“*BTC*”) is an industry-wide association formed to explore ways to use HD Radio technology to broadcast real-time traffic and other location-based information to portable navigation devices and automobile in dash systems. BTC’s founding members and bandwidth contributors are Beasley Broadcast Group Inc.; Bonneville International Corporation; Cobalt Media; Cox Radio Inc.; Emmis Communications Corporation; Entercom Communications Corp.; Greater Media Inc.; Hubbard Broadcasting; Lincoln Financial Media Company; National Public Radio; and Radio One Inc.

of 10 percent of a station's authorized analog power (-10 dBc).<sup>3</sup> Grant of the Power Increase Request is warranted by the extensive record developed in this proceeding, including comprehensive real-world test results demonstrating the numerous benefits that an increase in HD Radio digital power will provide: (i) allowing FM digital signals to more closely replicate their analog coverage; (ii) facilitating digital building penetration; (iii) adding robustness to enhance the listening experience; (iv) and fostering the rollout of portable HD Radio devices with integrated or small antennae. The real-world tests, which continue to be supplemented, also demonstrate that such an increase would not create any material risk of harmful interference to existing first adjacent analog operations.

**I. The Commission Should Grant the Digital Power Increase Request Now.**

A. Significant Investment in HD Radio Technology Is at Risk Due to Extremely Conservative and Inadequate FM Digital Power Limits.

Expeditious grant of the requested increase in FM digital power is critical to ensuring a successful transition to HD Radio technology. Nearly 2,000 radio stations nationwide have already invested substantial sums in HD Radio transmission equipment and have initiated digital broadcasting.<sup>4</sup> In addition to providing digital simulcasts of their analog programming, these broadcasters have also created more than 1,000 digital multicast streams, substantially enhancing the diversity of programming made available to their listeners.<sup>5</sup> Further, more than 100 HD

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<sup>3</sup> *Letter to Ms. Marlene Dortch from Joint Parties*, June 10, 2008 (MM Docket No. 99-32) (the "Power Increase Request").

<sup>4</sup> HD Radio Alliance, *HD Radio Reaches Major Milestones: 1000 Multicast Stations Now On-Air and 100 Unique Receivers to Choose From*, Mar. 25, 2009, available at: [http://www.ibiquity.com/press\\_room/news\\_releases/2009/1314](http://www.ibiquity.com/press_room/news_releases/2009/1314).

<sup>5</sup> *Id.*

Radio receiver models are commercially available, and automobile manufacturers have made HD Radio equipment available in 70 vehicle lines.<sup>6</sup>

However, Joint Commenters believe these significant investments are at risk and that the conversion to digital will be stalled as a result of the very conservative digital power levels at which FM HD Radio stations are currently permitted to operate. As a result of these severely constrained digital power levels, FM HD Radio digital coverage areas are considerably smaller than their analog counterparts and are often plagued with additional reception gaps and fading due to shadowing or other terrain challenges. Such signal gaps and fades are particularly troublesome for in-vehicle listening where a station's digital signal may drop in and out as the driver travels between various locations. The current limited digital power levels also reduce the ability of HD Radio digital signals to penetrate buildings and structures, severely impeding and often totally precluding indoor digital reception.

As a result of these digital service limitations, listeners accustomed to receiving a station's analog service may well find that reception of the companion digital signal is unavailable within various parts of the station's analog primary service area.<sup>7</sup> These reception limitations are even more problematic for digital multicast streams that do not have an analog companion signal that can be substituted as a proxy for the digital HD Radio stream when digital reception suddenly disappears.

Adoption of a very conservative FM digital power level may have been appropriate during the nascent stage of HD Radio implementation to insure the absence of interference

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<sup>6</sup> NYTimes.com, *HD Radio Crying Out to Be Heard*, Apr. 9, 2009, available at: <http://www.nytimes.com/2009/04/09/technology/personaltech/09pogue.html?pagewanted=all>.

<sup>7</sup> The Commission itself has long recognized that the public interest is best served by ensuring HD Radio coverage that duplicates each station's analog protected coverage area. *Digital Audio Broadcast Systems And Their Impact On The Terrestrial Broadcast Service*, 15 FCC Rcd 1722, 1735, *Notice of Proposed Rulemaking* (1999).

issues. However, now that the industry has substantially more experience with HD Radio technology, it is readily apparent that reception limitations are significant and harmful to the prospects for the successful public acceptance and growth of HD Radio service; on the other hand, first adjacent analog interference has proved to be a non-problem. The real world tests conducted by certain of the Joint Commenters and filed into the record in this proceeding demonstrate that these digital reception limitations can be significantly ameliorated by means of voluntary FM digital power increases up to -10 dBc.<sup>8</sup>

B. Grant of the Digital Power Increase Request Will Facilitate HD Radio Replication of Analog Coverage.

The June 2008 Power Increase Request was based on the results of extensive, real-world, testing which conclusively demonstrated that HD Radio operation at increased digital power levels will enable FM stations to broadcast digital signals whose contours more closely replicate those of their analog signals and will reduce the occurrence of signal drop-outs within the station's analog protected contour, where listeners justifiably expect to experience reliable reception. The test program found that Class B stations experienced an average increase of 24% in service radius and an average 56% increase in coverage area while Class A stations – which face substantial digital challenges as their digital power is often so low as to be below the noise floor – experienced even more impressive average increases of 30% in service radius and 67% in coverage area.<sup>9</sup>

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<sup>8</sup> See *HD Radio System Test Report – Compatibility and Performance Tests at Elevated FM Digital Power Level*, iBiquity Digital Corporation (May 2008) (“*Compatibility and Performance Tests*”) and *FM IBOC Building Penetration Tests at Elevated Digital Subcarrier Levels*, CBS Radio Inc. (May 2008) (“*Building Penetration Tests*”). Both of these reports have been submitted to the Commission to be filed in MM Docket 99-325.

<sup>9</sup> See *FM HD Radio System Performance at Elevated Carrier Levels*, iBiquity Digital Corporation, at 13 (Dec. 2007), attached as Appendix B to the Compatibility and Performance Report.



Continued real-world testing with elevated digital power levels by certain of the Joint Commenters has further verified the significant benefits of an increase in HD Radio digital power.<sup>10</sup> For example, station WRAT(FM), licensed to Point Pleasant, New Jersey, has found that its HD Radio digital coverage contours are extended between 7 and 14 miles along major commuter routes when operating at the -10 dBc digital power level – much more closely replicating the station’s analog coverage.<sup>11</sup> Similarly, station WKLB-FM, licensed to Waltham, Massachusetts, has observed during its additional testing that, in areas within 25 miles of its transmitter site, there were numerous locations where the station’s digital signal routinely faded out due to terrain and man-made structures at the -20 dBc digital power level. However, these fade out and signal drop issues were eliminated when the station’s digital power level was increased to -10 dBc.<sup>12</sup> Further testing by WKLB-FM found that digital operation at -10 dBc broadened the station’s HD Radio coverage so that it much more closely replicated the station’s analog protected contours along four heavily traveled radial routes and an interstate beltway in the Boston metropolitan area.<sup>13</sup>

Likewise, an increase in digital power will significantly improve building penetration capabilities of FM HD Radio signals. The real-world test program found that at current digital power levels, indoor HD Radio reception was poor in most structures unless they were located

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<sup>10</sup> See, e.g., *Interim Report, Station WKLB-FM, Waltham, Massachusetts*, FCC File No. - 20081031ACO, filed May 5, 2009 (“*WKLB-FM Report*”); *Request for Extension of Experimental Authorization, Station WRAT(FM), Point Pleasant, NJ*, FCC File No. – 20090108APJ, filed June 22, 2009 (“*WRAT(FM) Report*”). Although these documents have previously been filed with the Commission, copies are also attached to these Joint Comments as Exhibit A.

<sup>11</sup> See *WRAT(FM) Report*, at 4.

<sup>12</sup> See *WKLB-FM Report*, at 1.

<sup>13</sup> See *FM HD Radio System Performance At Elevated Carrier Levels*, at 9, Charles River Broadcasting Company, MM Docket 99-325 (June 30, 2009) (“*Elevated Carrier Levels Report*”).

near the transmitter location.<sup>14</sup> However, an increase in digital power to -10 dBc provided indoor digital reception that was comparable to current analog, and further enhanced by the improved audio quality of HD Radio signals.<sup>15</sup> Additional real-world testing has continued at various HD Radio digital power levels ranging from the current -20 dBc level up to and including -10 dBc.<sup>16</sup> That testing has further confirmed that an increase to -10 dBc is necessary to achieve indoor HD Radio digital reception comparable to existing indoor analog reception.<sup>17</sup> Thus, the requested digital power increase will allow listeners to enjoy the added benefits of HD Radio technology in a manner that is consistent with their historic, and expected, enjoyment of analog radio.

If listeners are precluded from experiencing HD Radio reception that is comparable to analog in terms of coverage or building penetration, widespread and effective implementation of HD Radio service will be severely impeded. As additional HD Radio receivers are introduced and consumer awareness of digital radio continues to increase, it becomes even more critical that the Commission allow stations to voluntarily increase their FM digital power to ensure that listeners' first experiences with HD Radio technology are not adversely affected by reception issues or other limitations.

Continued investment in HD Radio technology by equipment manufacturers has also resulted in new, integrated circuits ("chipsets") that can operate for relatively long periods on batteries and are making portable HD Radio devices a reality. Indeed, devices such as

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<sup>14</sup> See *Building Penetration Tests*, at 6.

<sup>15</sup> *Id.*

<sup>16</sup> See *FM HD Radio System Performance In Building Interiors At Elevated Carrier Levels*, Charles River Broadcasting Company, MM Docket 99-325 (July 1, 2009) ("*Building Penetration Report*").

<sup>17</sup> *Id.*

Microsoft's Zune HD are now currently being introduced into the consumer marketplace for the first time. Limiting digital power to -20 dBc in the context of these portable such as Zune HD devices is particularly challenging, as they rely on smaller or integrated antennas which are less efficient at capturing the RF signal than are the larger antennas used on automotive and other receivers. Reception issues for portable devices such as Zune HD will be further exacerbated during indoor listening. However, as with table-top and vehicle reception, the proposed digital power increase of up to -10 dBc will help ensure that portable devices are able to reliably receive HD Radio signals in a manner that is comparable to current analog reception.

HD Radio digital coverage comparable to analog is also a critical component for the wide deployment of innovative supplementary digital applications such as those being developed and promoted by the BTC. Those applications can provide up-to-the-minute, location based information including real-time traffic reports, weather alerts, and Amber Alerts to portable devices and in-dash automobile systems. Another application being developed for digital radio would dramatically enhance the nation's Emergency Alert System by automatically turning on HD Radio receivers and tuning them to a participating station when the Emergency Alert warning system is activated.<sup>18</sup> Not only could such a function proactively make critical emergency information available to listeners, but it could also facilitate delivery of related emergency information via HD Radio display screens.

The public interest benefit in having this type of data widely available via free, over-the-air HD Radio service, as opposed to distributed through more limited, subscription based devices such as cellular telephones or satellite radio receivers is readily apparent. However, one of the

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<sup>18</sup> See *Emergency Alert Improvements In Works For HD Radio Standard*, TWICE: This Week In Consumer Electronics, June 17, 2009, available at: <http://www.twice.com/article/CA6666023.html?q=emergency+alert+improvements>.

most significant roadblocks to widespread availability of such information using HD Radio technology is the inability of FM stations to provide digital coverage that is comparable to analog as a result of HD Radio digital power limitations. Indeed, global automakers and digital consumer device manufacturers have made it clear to BTC and its members that, due to the lead time to develop and make such devices commercially available, additional HD Radio applications may never be fully developed without a near-term and substantial increase in FM digital power levels.

C. Extensive Real-World Tests Demonstrate the Requested Digital Power Increase Would Not Create Significant Harmful Interference to Analog Stations.

In addition to conclusively demonstrating the performance improvements that would result from an increase in FM HD Radio digital power levels, the extensive field tests conducted at elevated HD Radio digital power levels found that increases up to -10 dB would not result in harmful interference to adjacent analog signals.<sup>19</sup> The comprehensive test program underlying the Power Increase Request produced audio recordings of first-adjacent analog stations in several challenging interference configurations while the test stations operated at both current and proposed (-10 dBc) digital power levels.<sup>20</sup> This test plan was designed to include extreme short-spacing scenarios in order to permit a “worst case” analysis of the effect of a digital power increase on first adjacent analog stations.<sup>21</sup> The audio recordings were submitted to an independent university for subjective evaluations, which concluded that the proposed increase in digital power will not significantly increase the risk of harmful analog interference.<sup>22</sup> The finding that operation at elevated digital power levels will not result in harmful analog

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<sup>19</sup> See *Compatibility and Performance Tests*, at 2.

<sup>20</sup> *Id.*, at 7.

<sup>21</sup> *Id.*, at 12.

<sup>22</sup> *Id.*, at 3.

interference is also validated by the fact that, even though the testing occurred over a period of several months, and additional testing continues to take place today, not a single cognizable listener complaint to either the Commission or test stations was lodged while those stations operated at elevated digital power levels.

Some parties have opposed the requested digital power increase on the basis of lab simulations undertaken by NPR Labs. Joint Parties and others have previously questioned aspects of the methodology and certain of the premises of NPR's study, which included the unrealistic assumption that all FM stations would simultaneously increase their digital power by a full 10 dB.<sup>23</sup> In addition, NPR's Study used carefully selected audio material and recording modes that highlighted potential interference effects.<sup>24</sup> These flawed premises, along with other questionable assumptions, produced results that dramatically overstated any first adjacent interference that would be caused by the proposed HD Radio digital power increase and completely ignored the practical reality that even for those stations already on the air with HD Radio signals, the switch to higher digital power will take place slowly and provide the Commission with ample opportunity to react to any potential (but highly unlikely) interference issues.<sup>25</sup>

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<sup>23</sup> See e.g., *Comments of Joint Parties*, MM Docket 99-325, filed Dec. 5, 2008, at 12; *Comments of The National Association of Broadcasters*, MM Docket 99-325, filed Dec. 5, 2009, at 8.

<sup>24</sup> See *Comments of Brian J. Kirby BSEE*, MM Docket 99-325, filed June 17, 2009. These comments noted that "listeners most concerned about [the interference NPR predicted] should be the very listeners that would support IBOC digital radio at -10 dBc" and reached the conclusion that "what NPR labs has done with the publication of the audio recordings, has shown the need to increased the IBOC digital signal level to -10 dBc and to increase it now." *Id.*

<sup>25</sup> Moreover, it should be noted that NPR study has been used by some parties to frontally attack the in-band on-channel digital standard. The Commission should not permit this narrowly-focused proceeding to be used as a referendum on the IBOC standard. See e.g., *Comments of Mullaney Engineering, Inc.*, MM Docket 99-325, filed Dec. 5, 2008 ("[T]he FCC should re-open the entire process and decide if other digital modulation techniques such as Digital Radio Mondiale (DRM) might not be better suited.").

D. Grant of the Digital Power Increase Request Should Not Be Delayed.

The Public Notice specifically inquires as to whether the Commission should delay action on the digital power increase request until NPR has completed its further studies and they have been subjected to review and comment.<sup>26</sup> Such delay is not warranted and could be harmful to the prospect for successful implementation of digital radio. Even if NPR does not encounter further delays, by NPR's own projections, the results of its study are not expected to be available until at least September.<sup>27</sup> If the release of that study is followed by a comment period, any action on the digital power increase request would likely be extended well into 2010. Such a delay would be particularly harmful to the HD Radio rollout given the current stage of consumer rollout, the introduction of new portable receivers, the inclusion of HD Radio receivers as standard and optional equipment in automobiles, and innovative uses of HD Radio technology such as is envisioned by the BTC and others.

Given the growing availability of HD Radio receivers and the introduction of portable HD Radio devices, it is critical that the Commission grant the requested digital power increase now so that consumers can enjoy HD Radio reception that is not unnecessarily and unduly compromised by power constraints.

**II. The Commission Should Permit Stations to Increase Digital Power Up To -10 dB.**

A. Grant of the Full Power Request Is Warranted.

The Public Notice inquires whether the Commission should allow radio stations to increase their digital power by up to -10 dBc as requested, or whether it should adopt some lesser, "provisional" power increase.<sup>28</sup> Commercial realities support affording stations the

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<sup>26</sup> See Public Notice, at 2.

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

option to voluntarily increase digital power up to the -10 dBc level sought by the Power Increase Request, even though not all stations would be expected to take advantage of the full increase immediately.

In order to implement any increase in HD Radio digital power levels, most broadcasters will need to make a significant investment in new digital transmission equipment. Before making such an investment, broadcasters will require certainty as to what the ultimate digital power levels will be. Indeed, many broadcasters will be unwilling to invest in digital transmitters and other equipment that could accommodate only a small increase in HD Radio digital power levels if there will be a subsequent need to replace that equipment in order to accommodate a further digital power level increase in the next few years. If the ultimate digital power level is unknown, many broadcasters will forestall any new equipment purchases, HD Radio reception issues will persist, and the digital radio rollout will, inevitably, stall.

This concern is illustrated by the fact that, all other variables being constant, a station purchasing equipment to enable, for example, a 6 dB power increase would need a transmitter capable of only four times the station's current digital power levels, while facilitating a 10 dB increase would require a transmitter capable of ten times the current digital power level. Alternatively, a station could choose to upgrade or replace its antenna system in order to increase digital power levels. Indeed, some stations might find that both transmitter and antenna modifications provide the most effective and economical way in which to take advantage of an increase in permitted HD Radio powers. Until the final power level is known, however, many stations may simply deter purchasing any new equipment for fear it would provide either too little or too much transmission capability or be otherwise inappropriate for the ultimate HD Radio digital power level. Similarly, the high-level and mid-level combining systems used to

produce HD Radio signals at the current HD Radio digital power limit are not practical at higher HD Radio digital power levels. Instead, broadcasters will need to employ an alternate method at increased digital power levels – but the method they elect will depend on the ultimate digital power levels that will be permitted by the Commission. Thus, a lack of certainty as to the ultimate HD Radio digital power level will deter broadcasters from investing in any equipment to facilitate an interim higher digital power operation until final digital power limits are approved.

B. An Increase Up To -14 dBc is Acceptable Only As an Interim Measure Prior to a Full Increase to -10 dBc.

If the Commission is unwilling to grant the full digital power increase as requested until NPR has completed its latest round of studies, the Commission should grant an interim digital power increase to no less than -14 dBc immediately. An interim increase to that level, while inadequate to completely solve the coverage and building penetration problems which beset operation at -20 dBc (as discussed below), would allow at least some broadcasters to improve their HD Radio service. And to the extent that some broadcasters do take advantage of the interim level, experience with -14 dBc will serve to further validate the findings that operation at higher digital power levels will not create widespread harmful interference.

However, such an interim increase would still leave many broadcasters with inferior FM digital service that is significantly smaller than their analog service. Thus, it is critical that the Commission ultimately authorize the full 10 dB increase as that is the level generally necessary to allow FM HD Radio digital transmissions to replicate analog coverage.

As noted, the need to make multiple purchases of digital equipment to take advantage of the multiple digital power level increases could cause many broadcasters to forego any interim purchases until the final digital power level is established. The supposed benefit of any such



interim digital power increase would be ephemeral to the extent real-world realities would discourage broadcasters from taking advantage of interim digital power levels.

The need for certainty as to ultimate digital power levels also necessitates that any partial digital power increase be granted on an “interim,” but permanent basis. Thus, any digital power increase cannot be “provisional,” in the sense of being susceptible to reduction or revocation in the future. Broadcasters will not purchase new digital equipment for such a “provisional” increase out of concern that such equipment would become unusable and obsolete if the Commission subsequently negated the increase.

Lastly, based on the additional real-world field tests that have been conducted, it is clear that an increase in digital power of less than 6 dB would not provide any meaningful improvement in either geographic coverage or building penetration. As previously noted, station WKLB-FM found that all of the station’s digital fade outs in areas located within 25 miles of the station’s transmitter were eliminated by operation at -10 dBc. The station conducted similar tests at digital power levels of -15 dBc (*i.e.*, an increase of 5 dB) and found that “significant signal losses” continued to exist at that digital power level.<sup>29</sup> Indeed, in analyzing HD Radio reception on Route I-495, the heavily traveled beltway that runs in an arc about 20 miles north, west, and south of Boston, the station found that HD Radio reception as listenable at about only 50% of the time at the -20 dBc level, improving to approximately 75% of the time at -15 dBc level, but more than 95% of the time at the -10 dBc level.<sup>30</sup> When operating at -14 dBc, the station found considerably improved HD Radio reception, but still experienced some drop outs within its protected analog contour that could potentially dampen listener satisfaction.<sup>31</sup>

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<sup>29</sup> *WKLB-FM Report*, at 1.

<sup>30</sup> *Id.*, at 2.

<sup>31</sup> *See Elevated Carrier Levels Report*, at 11.

These additional real-world field tests found similar results with regard to building penetration issues. Indoor reception tests using both tabletop receivers and soon-to-be released portable HD Radio receivers found that in a variety of commercial and residential structures, indoor reception was extremely limited or nonexistent at the current -20 dBc level.<sup>32</sup> Measurable improvements in HD Radio reception were seen when the test station increased its HD Radio digital power to the -14 dBc level, though indoor reception was still generally challenged for the portable HD Radio receiver.<sup>33</sup> Only when the test station's HD Radio digital power was increased to -10 dBc was indoor reception reliable.<sup>34</sup> As a result, a digital power increase of less than 6 dB would be valueless and should not be considered by the Commission.

### **III. The FCC's Current HD Radio Standards Are Adequate.**

The Power Increase Request was carefully structured to insure that under the Commission's existing standards and rules, HD Radio stations, even when operating at the increased digital power level of -10 dBc, will not create harmful interference to first adjacent analog operations. In particular, the requested HD Radio digital power increase fits within the existing FCC FM mask. Thus, grant of the requested digital power increase does not necessitate fashioning additional interference standards.

In developing the request for the HD Radio digital power increase, the Joint Parties carefully considered the results of their real-world test program. Those tests found that the only scenario with any potential increased impact on analog operations would be when some Super B stations operate at higher digital power levels, which might affect analog operation of first

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<sup>32</sup> See *Building Penetration Report*, at 12 - 17.

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

adjacent Class B stations.<sup>35</sup> Consequently, the Joint Parties recommended a special approach to these situations, allowing those Super B stations to increase their digital power only to the greater of -20 dB below the station's currently authorized analog power levels (as currently permitted), or -10 dB below the maximum analog power authorized for that class of station, as adjusted for height, absent any grandfathered super power.<sup>36</sup> The Joint Parties included this component of the digital power increase request in order to mitigate any concerns about potential harmful interference issues by this class of stations.

Similarly, grant of the requested HD Radio digital power increase would not necessitate any additional procedures to address interference complaints made by analog stations. The Commission already has adequate and flexible complaint procedures in place to expeditiously resolve any documented allegations of harmful analog interference.

Moreover, the total absence of complaints resulting from the real-world tests with elevated digital power levels suggests that the Commission will not experience the filing of a significant number of cognizable complaints of harmful interference to analog stations. Consequently, the Commission's existing complaint procedures should be more than adequate to handle the minimal number of complaints that could be reasonably anticipated as a consequence of any digital power increase.

#### **IV. The Commission Should Expeditiously Grant The Power Increase.**

The vast majority of parties participating in this proceeding, including NPR,<sup>37</sup> have acknowledged that increasing FM digital power levels is absolutely necessary to insure that the conversion to HD Radio technology continues unabated. HD Radio stations cannot continue to

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<sup>35</sup> See *Power Increase Request*, at 9.

<sup>36</sup> *Id.*

<sup>37</sup> See *Reply Comments of National Public Radio, Inc.*, MM Docket 99-325, filed Jan. 12, 2009.

operate at nominal digital power levels, with the attendant reception challenges, and expect equipment manufacturers, auto companies, consumers, or broadcasters to embrace this emerging technology with the level of enthusiasm and demand that is necessary to promote the ultimate conversion to digital radio broadcasting.

In particular, broadcasters and equipment manufacturers must have certainty as to the ultimate HD Radio digital power levels that will be allowed by the Commission before they will be willing to make the significant investments in new digital devices that will be necessary to provide an HD Radio service with sufficient robustness to capture the public's attention.

## **V. Conclusion.**

Based on the extensive record in this proceeding and for the reasons stated above, the Joint Commenters respectfully submit that the Commission should promptly permit FM stations to voluntarily increase their digital power levels up to -10 dBc. Although it will not completely resolve existing HD Radio reception issues, the Joint Commenters recognize that an interim digital power increase of up to 6 dB (*i.e.*, up to -14 dBc) would allow some stations to improve their existing HD Radio performance and would serve to validate prior test results on which the Power Increase Request was premised; thus, such an interim step could have utility as part of a larger recognition by the Commission of the need to ultimately permit FM HD Radio stations to increase digital power levels up to -10 dBc.

Respectfully submitted,

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**Emmis Communications Corporation  
Entercom Communications Corp.  
Greater Media, Inc.  
Harris Corporation  
Journal Broadcast Corporation  
Lincoln Financial Media Company  
Nassau Broadcasting Partners, L.P.  
Nautel Maine Inc.  
NRG Media, LLC  
Sacred Heart University, Inc.**

By. 

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July 6, 2009

Their Attorneys

## **Exhibit A**

- Experimental authority report filed with the FCC by station WKLB-FM, Waltham, Massachusetts, May 5, 2009.
- Experimental authority report filed with the FCC by station WRAT(FM), Point Pleasant, New Jersey, June 22, 2009.

**Interim Report  
Station WKLb-FM, Waltham, Massachusetts  
Experimental Operations with IBOC Power Levels  
Above the Currently Permitted Value Of -20 dB Relative to Analog Power**

**May 5, 2009**

WKLb-FM's HD Radio power levels ranged from the licensed 20 dBc up to an including -10 dBc. Observations were made qualitatively with a Kenwood HD Car Radio (Model HDR-100) installed in a 2004 Toyota Avalon with a factory installed in-glass antenna, and in a 2001 Toyota 4-Runner with a factory installed metal rod antenna. For most of these observations, the radio mode of "forced digital only reception" was selected. Observations were made as the various routes were driven, noting the areas and frequency of audio muting that occurred by virtue of the loss of the bit stream to the radio.

Quantitative observations are still being made using the same two vehicles and radios while feeding a "good or bad" status into a laptop computer data collection program; such data is based on the "blend to analog" status of the radio. A signal that has not blended to analog is presumed to be in an area of good reception and a signal that has blended to analog is presumed to be in an area of poor reception. This data, along with simultaneous GPS coordinates, are recorded in a text file on the laptop, and will be overlaid on a commercially available street mapping program to produce a map showing the coverage areas.

During December 2008, observations were made at the -10dbc power level. From the authorized site, the licensed WKLb-FM analog ERP is 12,000 watts. Thus, the IBOC test signal level is 1200 watts ERP for a -10 dBc offset. Extensive driving evaluations, both qualitative and quantitative, showed remarkable improvement in coverage relative to the currently authorized level of -20 dBc. In general, it was observed that the -10 dBc digital signal level approximates or, in some cases, slightly exceeds the coverage of WKLb-FM's full power analog signal.

Particular care was taken to observe improvements in coverage in areas within 25 miles of the station's transmitter site. At the -20 dBc digital power level, there were numerous areas where the digital signal would routinely and predictably fade out due to terrain and manmade obstacles (by terrain, we are referring to gentle rolling hills and valleys in rural areas outside the City of Boston). During the several months of observations, it was apparent that *all* of these problems disappeared while operating at -10dbc. There were no instances where the signal was lost in either vehicle in any areas where the signal loss was determined to be a problem at the -20 dBc level. When the IBOC transmit power was reduced to -15dbc, there were significant signal losses that resurfaced in those areas, despite the fact that the -15 dBc power level was considerably in excess of the normal -20dBc digital power level; the coverage seemed to be significantly worse (than at -10 dBc) at the -15dbc level even in areas within 25 miles of the transmitter location. To date, no specific tests have been performed at any levels

between -10 dBc and -15 dBc. Charles River intends to perform these tests in order to obtain more granularity if its request for an extension of WKLB-FM's experimental authority is granted.

In terms of the limits of coverage, a particularly rigorous study was conducted with regard to interstate Route I-495, a highway loop that extends in an arc about 20 miles north, west and south of the City of Boston. At -20 dBc digital power levels, this extremely heavily traveled major beltway is generally served poorly by any Boston IBOC station, sited at either the Prudential Tower building (7 class B FM's) or at the so called Needham/Newton antenna farm (most of the remaining class B stations). At the -20 dBc level, most stations are listenable in the digital mode only approximately 50% of the time while traveling this highway. Generally speaking, Charles River observed better than 75% coverage at the -15 dBc level and better than 95% coverage at the -10dbc level.

Observations also were made while driving on interstate highway I-93, from the City of Boston northerly into New Hampshire. Like I-495, I-93 is an extremely heavily traveled commuter route. At the -20 dBc digital power level, signal breakup commences around Andover, Massachusetts, where interstate I-495 crosses interstate I-93. The signal then improves as the terrain rises slightly approaching the New Hampshire border. From the border northward, the signal deteriorates rapidly. At New Hampshire Exit 3, the digital signal is audible only approximately 50% of the time; any HD-2 or HD-3 signals would be deemed to be unlistenable. After passing Exit 4, the signal is present less than 10% of the time.

Traveling this same route at the -10 dBc level, the signal was virtually seamless well past Exit 15 near Concord NH (nearly 60 miles north of the transmitter), with only a few minor momentary drops between Exit 4 and Exit 15. In this same area, the analog signal became increasingly scratchy and was totally unlistenable for short periods of time. The digital signal was listenable nearly 95% of the time as far as the xit for New Hampshire 20 near Tilton, New Hampshire. This represents slightly better coverage range than the station's analog signal.

Traveling this same route while operating at a -15 dBc level produced a signal that was audible (50% listenability) only to Exit 10, just south of Concord, New Hampshire. This represents a notably abbreviated coverage range as compared to the analog signal.

Due to time constraints, observations have not yet been made to compare building penetration at various IBOC levels. However, Charles River has developed a plan to perform those observations, which will be implemented if the request for extension of the WKLB-FM experimental authority is granted.

In general, Charles River intends to continue to perform these types of observations at several additional levels between -10 dBc and -15 dBc to obtain a better idea of how much each decibel of increased power translates into actual real world improvements in signal coverage. In addition, Charles River intends to chart the results of



these observations and to make those maps available to the FCC. Finally, Charles River hopes to document reception results for table and other portable radios located inside buildings to see how building penetration is impacted by various IBOC transmission levels.

Based on the previously detailed testing performed by Charles River during the initial term of the WKLB-FM experimental authorization, it does not appear that a digital power increase to -15 dBc – the primary intermediate power level tested to date – will be sufficient to overcome the current digital v. analog coverage disparity and achieve the critical parity of coverage between the two services. Additional testing at more granular powers levels between -15 dBc and -10 dBc is essential to formulating a sound and effective solution to the current coverage disparity that, very literally, threatens the success of a digital radio service in the United States.

Milford K. Smith, Jr.  
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Greater Media, Inc.

Paul Shulins  
Director of Technical Operations  
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**Greater Media, Inc.**

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June 22, 2009

FILED/ACCEPTED

JUN 22 2009

Federal Communications Commission  
Office of the Secretary

**VIA HAND DELIVERY**

Ms. Marlene H. Dortch, Secretary  
Federal Communications Commission  
Office of the Secretary  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

**Re: Request for Extension of Experimental Authorization  
Station WRAT(FM), Point Pleasant, NJ, Facility ID No. 59530  
File No. - 20090108APJ**

Dear Ms. Dortch,

In compliance with the terms of the experimental authorization issued to WRAT(FM) (the "Station") on January 22, 2009, this letter provides an interim report on the observations of The Sentinel Publishing Co., the Station's licensee ("Licensee") during periods of operation with elevated HD Radio power levels. Digital power levels ranged from the licensed -20 dBc, up to and including -10 dBc, and continued, mainly at -10 dBc, during virtually the entire duration of the experimental authority. There were no complaints of interference from any FM radio station during this authorization period.

The Station is a 3 kW equivalent Class A FM station, operating on channel 240 with an ERP of 4 kW at a HAAT of 73 meters utilizing an optimized ERI Lynx two level dual input antenna. Therefore, the Station's -20 dBc ERP is 40 watts and the -10dBc ERP is 400 watts. The Station is licensed to Point Pleasant, NJ with transmission facilities in nearby Lake Como, NJ. The Station studio and transmitter are located in the coastal region of New Jersey and, as such, is largely surrounded by terrain that is generally very flat and largely devoid of any significant obstructions, especially north and south of the transmitter location. Therefore, the Station represents a nearly "best case" propagation scenario for its digital signal. In spite of these optimal conditions, the Station, operating at -20 dBc since 2005, has observed a significant abbreviation of its digital coverage as compared to that of its analog facility.

The following details the observations of the Station's chief engineer, Mr. William (Bill) Clanton and Greater Media, Inc.'s director of technical operations in New Jersey, Mr. Keith Smeal, a highly experienced and long time broadcast engineer who was, prior to assuming his duties in New Jersey, assistant chief engineer of Greater Media's Philadelphia stations including WMGK, WBEN-FM, WMMR, WNUW and WPEN(AM). Earlier observations of the relative

coverage of the Station over specific driving routes at -20 dBc and -10 dBc power levels, as conducted by iBiquity Digital Corporation ("iBiquity"), are contained in the Commission's record of the digital radio proceeding. The observations made over the duration of this current experimental authority period extend iBiquity's observations to additional driving routes, address potential interference to a short spaced first adjacent channel station and discuss briefly the relative building penetration at the increased digital power level:

### **Station Findings**

The Station's HD power levels were periodically changed from the licensed -20 dBc to -10 dBc during the authorized period. Qualitative observations were made using the following three vehicles:

**Vehicle 1.** 1997 GMC Jimmy with a Kenwood HD Car Radio (Model HDR-100) with a factory installed metal rod antenna.

**Vehicle 2.** 2003 Chevy Trailblazer with a Kenwood HD Car Radio (Model HDR-100) with a factory installed metal rod antenna.

**Vehicle 3.** 2006 Ford Escape with a Kenwood HD Car Radio (Model HDR-100) using an aftermarket roof rack mounted metal rod antenna.

The observations were made in "forced digital only" mode, available on the Kenwood receivers. Observations were made on (1) routes driven specifically for the purposes of signal evaluation; (2) routes routinely and repeatedly driving during the normal course of business and (3) routes driven on specific venues for Station related activity. These qualitative observations are preliminary to quantitative observations/measurements planned for the near future. The specific routes were chosen to complement prior testing by iBiquity and Greater Media by assessing previously untested population centers.

The resulting observations indicate a significant improvement in digital coverage at the -10 dBc level. The preliminary results show reliable reception of the digital signal more closely approximating, and in some cases slightly exceeding, the Station's protected contour.

The Station operates at 95.9 MHz on the upper first adjacent channel to another Greater Media, Inc. ("Greater Media") owned station, WBEN-FM, Philadelphia, which operates at 95.7 MHz. WBEN and the Station are short spaced by 9 km, referencing 73.207 of the Commission's Rules. Greater Media's vice president of radio engineering, Milford Smith, has made numerous observations of the WBEN signal at the periphery of its 54 dBu, protected contour in the direction of the Station. In no case was there any evidence of interference to WBEN from the Station operating at the elevated -10 dBc power level.

As noted previously, the Station is licensed to Point Pleasant, NJ with its transmitter site located in Lake Como (formerly South Belmar), NJ (both are coastal towns). The Garden State

Parkway ("GSP"), a major coastal New Jersey North/South thoroughfare, is situated just inland from the Station. Interstate 195 ("I-195") is a major East/West highway which runs due west from Lake Como. Larger local routes in the listening area include NJ-18 (NW), NJ-66 (E/W), NJ-33 (E/W), US Route 9 (N/S) and various county roads.

#### I. Driving Observations

Using the vehicle/radio configurations described above, observations of the HD signal at both power levels were made. Along the aforementioned highly traveled roadways, a marked improvement in performance was noted at the elevated signal level, both in coverage area and the quality of that coverage. The quality or robustness of coverage is particularly important given the "cliff effect" of digital signal loss, especially regarding HD multiplex channels which have no analog backup.

##### *a. Loop 1 GSP North at -20 dBc*

**Vehicle 3:** Proceeding northward on the GSP from the Station, audible dropouts of one second or less began at mile marker 106.9, and occurred over the next two miles. The duration of the dropouts increased over the next mile until the signal was muted 80% of the time or more over the next four miles, except when cresting hills. North of mile marker 116 the signal was nearly non-existent, except for the occasional drop-in of a second or two. The path through the neighborhoods of Holmdel and Marlboro to reach NJ-18 to return to the Station yielded sporadic drop-ins of digital audio but no reliable service. The HD signal was approximately 98% absent. NJ-18 runs northwest/southeast between exits 29 and 22, turns east/west at exit 15, then proceeds south to Lake Como. The section between exit 22 and 15, at approximately 100' AMSL is slightly shadowed by a series of small hills ranging from 180' ASML to 250' AMSL. Through this section of road, which is well within the Station's protected contour, HD reception was 50% or less. At marker 15.2, reception solidified and was solid into Lake Como.

The Station occasionally originates remote broadcasts from the PNC Bank Arts Center, a venue which hosts frequent large concerts and other well attended events located at Exit 116 of the GSP. At the -20 dBc level, intelligible reception would wholly depend on the location of a vehicle on the venue property. A typical listener, traveling the GSP, would likely have given up listening considerably short of the venue.

##### *b. Loop 1 GSP North at -10 dBc*

**Vehicle 3:** The first audible dropout of one second or less occurred near mile marker 115.1. For the next three miles, the signal was present between 50% and 70% of the time, with the signal losses on the shadow side of hills. Past marker 120 the signal was only present at the crest of hills, and was gone at marker 124.7. Traveling through the neighborhoods of South Amboy, Sayreville, and Old Bridge to reach NJ-18 the signal was present between 5% and 10% of the time. The analog signal was listenable, though noisy. From NJ-18 in Old Bridge returning to Lake Como the signal was first detected at marker 31, and was 70% present over the next six miles. From marker 24 into the Station, except for a brief dropout at marker 20, the signal was 100% present. *This represents a marked improvement in listenable digital signal;*

*some 8 miles from the point of failure at -20 dBc as compared to that at -10dBc on the GSP and a similar gain of some 9 miles on Route 18, another major commuter corridor.*

During recent appearances at the PNC Bank Arts Center, with the Station operating at a -10dBc power level, Vehicle 2 had no trouble receiving the signal anywhere it traveled on the property.

*c. Loop 2 Westbound 66/33, returning I-195 at -20 dBc*

**Vehicle 3:** The first dropout occurred at the underpass at the NJ-66/NJ33 junction and subsequently at the NJ-33/NJ-34 intersection. Larger dropouts began at marker 34, with the radio being unmated approximately 75% of the time. The signal reliability began to diminish until the NJ-33 Freehold bypass, a slightly elevated highway, was reached. The radio held the Station's signal to Hall Mill Road, then reception became sporadic. Traveling west on NJ-33 to CR-537, the signal was present less than 20% of the time. Reliability further decreased while traveling west on CR-537 and south on CR-527 to connect with I-195 at Exit 21. At mile marker 24.2 on I-195 the radio captured the Station's signal only momentarily. The signal reached 80% or better reliability at mile marker 27, and was solid at mile marker 28.9.

*d. Loop 2 Westbound 66/33, returning I-195 at -10 dBc*

**Vehicle 3:** Except for a momentary drop at Hall Mills Road, the signal remained solid to the Rt. 537 ramp. On CR-537, which runs northeast to southwest, the signal was 80% reliable to CR-524, then 50% reliable to, and along CR-527 to I-195 Exit 21. On I-195 eastbound, the signal improved to 90% reliability at mile marker 22. *This represents an improvement of nearly seven miles in digital service westward from the Station along I-195, an extremely heavily traveled commuter and summer beach vacationer route.*

*e. Traveling Southbound From the Station on the GSP*

**Vehicle 2:** The Station's Chief Engineer, William Clanton, Sr., travels the GSP between Exits 63 and 98 on nearly a daily basis. The terrain along the GSP in this segment is virtually devoid of changes in elevation. His observations over the entire experimental authorization period indicate the -20 dBc signal is listenable to Exit 88 of the GSP, and the -10 dBc signal to Exit 74. He has also observed an increased robustness against the effects of temperature inversions/band openings along the coast (a very frequent phenomenon, especially during the summer months) at the -10dBc level. *This represents an improvement in digital coverage of approximately 14 miles to the south of the Station's transmitter site.*

## **II. A Building Penetration Observation**

A recent real life building penetration observation occurred just after grant of the current experimental authority. The Station conducted an annual remote broadcast at the Asbury Park Convention Hall, a frequent host to a variety of large events, which is located approximately five miles from the Station. In prior years, the -20 dBc HD signal was unable to be received in the building without utilizing an external antenna. At the elevated digital power level, the signal could be received inside the venue on demonstration radios without an external antenna.

### III. Conclusions

Based on the previously detailed testing performed by the Station's licensee during the initial term of the Station's experimental authorization, it appears that an increase in digital power to -10dBc greatly improves the coverage for a Class A station in relatively flat terrain, both in terms of coverage area and the quality and robustness of that coverage. This is critical, given the sudden and absolute failure mode of the HD signal. Listeners are not likely to tolerate sudden drops out more than occasionally before seeking an alternate audio source. Further quantitative testing would be appropriate to further support these observations. Additional testing will also be required to determine if any intermediate power level will adequately provide replication of the analog coverage area although it appears that a power level very close to -10 dBc will be necessary to fully replicate analog coverage with the digital signal. No interference to any FM station was reported or observed during this extended period of operation at the elevated digital power level, including to short spaced WBEN-FM, Philadelphia.

Therefore, Licensee respectfully requests a six month extension of its currently experimental authority to carry out further testing at elevated power levels and to gather additional data on building penetration. Station also would like to continue its work with other industry stakeholders in pursuing the common goal of a realistic and efficacious digital power increase. As noted previously, the recently constructed Station transmission facility is equipped with a new design ERI dual input/dual feed Lynx antenna and -10 dBc transmitter power output capability, this making the Station an ideal and largely unique Class A test bed for further studies.

Thank you for your consideration of this request.

Respectfully Submitted,

*Keith Smeal*

Keith Smeal

Director of Technical Operations

Greater Media New Jersey

*Milford K. Smith, Jr.*

Milford K. Smith, Jr.

VP, Radio Engineering

Greater Media, Inc.

cc: Ann Gallagher, Audio Division, Media Bureau